FACT SHEET
(Pursuant to Nevada Administrative Code [NAC] 445A.401)

Permittee Name: **Hycroft Resources and Development, Inc.**

Project Name: **Hycroft Mine Project (formerly Brimstone Project)**

Permit Number: **NEV0094114**
Review Type/Year/Revision: **(Renewal 2017, Fact Sheet Revision 01)**

A. Location and General Description

Location: The Project is located on public (Bureau of Land Management) and private land in Pershing and Humboldt Counties in Sections 13, 14, 22-27, and 33-36, Township 35 North (T35N), Range 29 East (R29E); Sections 7, 16-21, and 28-32, T35N, R30E; Sections 1-5, 9-12, and 14, T34N, R29E; and Section 6, T34N, R30E, Mount Diablo Baseline and Meridian, on Jungo Road (Humboldt County Road 49) approximately 50 miles west of the city of Winnemucca, near the historic town site of Sulphur.

This Fact Sheet is based on the assumption that the information submitted in the application of 29 December 1994, as modified by subsequent approved amendments, is accurate and that the facility has been constructed and is being operated as specified in the application.

Characteristics: The Hycroft Mine Project consists of open pit mining with ore processing using conventional cyanide heap leaching technology and precious metal recovery via zinc precipitation (Merrill-Crowe) and carbon columns. Facilities are required to be designed, constructed, operated, and closed without any discharge or release in excess of those standards established in regulation except for meteorological events which exceed the design storm event.

In December 2010, Hycroft Resources and Development, Inc. (Permittee) submitted a minor modification which proposed increasing the permitted processing rate from 10 million tons per year to 12 million tons per year. The modification was approved by the Nevada Division of Environmental Protection (Division) in February 2011. A major modification was submitted in May 2011 proposing to build a new heap leach pad on the site of the closed Lewis pad and increase the processing rate to 30 million tons per year. The major modification was approved by the Division in December 2011. In December 2011 the Permittee submitted a major modification proposing the addition of the north and south process areas, an increase of the Brimstone and Lewis Heap Leach Pads permitted height to 400 feet, and an increase in permitted processing rate to 36 million tons of ore per year. The major modification was approved by the Division in September 2012. In December 2012 the Permittee submitted a minor modification proposing the addition of a Merrill-Crowe facility at the North Process Area. The minor modification was approved by the Division in May 2013.

In January of 2012 the Permittee submitted a major modification that included construction of a heap leach facility on the south extent of the property. The facility was referred to as the South Heap Leach Facility (SHLF). The major modification was approved by the Division in September 2012. Then the Permittee submitted another major modification in March of 2013 to construct a combined heap leach and tailings storage facility, referred to as the South Processing Complex (SPC), in the same location as the previously permitted SHLF. The SPC uses the new SHLF, constructed in a horse shoe shape, to provide the embankment for the Tailings Storage Facility (TSF) located in the central portion of the new SHLF.

As part of the 2013 major modification application, a mill and related process facilities were proposed. High grade ore is processed through an approximately 65,000 tons per day (tpd) Phase 1 concentrate milling circuit with a 132,000 tpd final phase capacity. Tailings are pumped to the TSF at the South Processing Complex. The 2013 major modification was approved by the Division in August 2017.

In September 2014, the Permittee submitted a minor modification to expand the Brimstone-North Heap Leach Facility to the southeast by approximately 80 acres including an additional Event Pond at the existing North Area Merrill-Crowe facility. The minor modification was approved by the Division in March 2015.

In April 2019, the Permittee submitted a major modification to construct a new heap leach facility named Hycroft Heap Leach Facility Stage 1 (Stage 1 HLF) north of the North Processing Facility. The Stage 1 HLF will have a storage volume of 29 million tons and is the first stage of the larger facility (Hycroft HLF) with a storage capacity of 550 million tons. The ultimate footprint of the Hycroft HLF will cover approximately 925 acres, the Stage 1 footprint is approximately 390 acres including the ponds, channels, and roads. Of this area, 234 acres are geomembrane lined, with the HLF pad comprising 204 of these acres. Pregnant solution collected from the pad will be pumped to the existing North Merrill-Crowe process facility for precious metals recovery. The Barren solution from the North Merrill-Crowe facility is then returned to the top of each lift and applied over a designated cell area using a drip and sprinkler system. The major modification was approved by the Division in Month 2020.

B. <u>Synopsis</u>

Geology

The Hycroft Mine Project operates within the Hycroft deposit, a low-sulfidation, quartz-adularia, gold and silver epithermal system, formed during a 3 million year interval of hydrothermal activity. The Hycroft deposit is located within the Basin and Range physiographic province in northwestern Nevada. Mineralization covers a surface area of 15 square kilometers, and is dominantly controlled by north-northeast-striking normal faults. The source for the hydrothermal fluids is interpreted to be heating of meteoric waters by an abnormally high heat gradient in an area noted for geothermal activity, with gold and silver mineralization scavenged from volcanic and sedimentary rocks and carried as bisulfide complexes in low-salinity, CO_2 rich fluids. Continued hydrothermal activity at the site is active as evidenced by hot water in some drill holes.

Project Overview

The Hycroft Mine Project primarily consists of an open pit mine, weak cyanide heap leach pads, and three process areas. The Brimstone process area consists of the Brimstone Heap Leach Pad constructed in two phases, the Lewis Heap Leach Pad, High Pregnant Pond, Low Pregnant Pond, Barren Pond, Event Pond, and Diatomaceous Earth (DE) Settling Pond, a process plant, waste rock dumps (WRD), an emergency overflow pond, which was previously used as a pregnant pond for the Lewis Project, and the Brimstone Merrill-Crowe process building. In December 2009, an Engineering Design Change (EDC) was submitted to the Division proposing to transfer the Crofoot High Pregnant Pond, Crofoot Low Pregnant Pond, Crofoot Overflow Pond, French Drain Outflow, and Brimstone-Crofoot Solution Transfer Pipeline from the Crofoot Permit (NEV0060013 now in closure) to the Hycroft Mine Permit (NEV0094114). The ponds and pipeline had not been used for several years due to the closure status of the Crofoot site. The EDC was approved by the Division with the condition that the subject components be inspected and brought into compliance with the requirements of NAC 445A.350-447 where applicable. In addition, the Crofoot High Pregnant Pond was retained in the Crofoot Permit due to its present function as a collection pond for Crofoot Heap Leach Pad draindown.

The North Process Area, added as part of the major modification of December 2011, consists of the North Heap Leach Facility, the North Pregnant Pond, the

North Barren Pond, the North Pregnant Vault, the North Barren Vault, two DE Settling Ponds (east and west), the North Event Pond, and the North Merrill-Crowe Facility. The entire North Process Area is located to the northeast of the existing Lewis Heap Leach Pad.

The South Process Area, also added by the major modification of December 2011, is located southeast of the existing Crofoot Heap Leach Pad, and consists of the South Heap Leach Facility, the South Pregnant Pond, the South Barren Pond, the South Pregnant Vault, the South Barren Vault, two DE Settling Ponds (north and south), and the South Event Pond. The South Process Area was revised with the application of a major modification in March 2013 into the South Combined Process Area which includes a conventional mill and TSF. The major modification was approved by the Division in August 2017 with the approval of the 2017 Permit renewal. See section titled *South Combined Process Area* for a more detailed discussion.

Mining

Mining within the pit is not expected to result in the formation of a pit lake due to the depth to groundwater (see *Receiving Water Characteristics* below). Waste rock has been routinely characterized pursuant to the regulations and the Permit. In 2009, waste rock characterization showed the potential for acid generation. Humidity cell testing was initiated in October 2009, and the Division received the report of test results on 8 June 2011. The results showed that argillic, propylitic, and silicic alteration types that have been partially oxidized or are unoxidized have a potential to generate acid. These alteration types represent approximately 30 percent (%) of the total waste rock in the current mine plan. Based on the results, the Permittee, in accordance with Permit requirements, submitted a revised Waste Rock Management Plan on 28 October 2011 for Division review. The plan was accepted by the Division in July 2012.

Brimstone Process Area

The 9.42 million square foot Brimstone Heap Leach Pad, which is divided into two phases ultimately consisting of a total of 10 cells (Phase I with 4 cells, Phase II with 6 cells), accommodates 50 million tons of run-of-mine ore. Phase I and Phase II are both complete. Ore has been end-dumped onto each pad in lift thicknesses of 25 to 50 feet to a maximum permitted heap heights of 200 feet for Phase I and 400 feet for Phase II.

The liner system for Phase I consists of a 1-foot thick, low permeability clay layer ($1x10^{-7}$ centimeters per second (cm/s) maximum) with synthetically-lined internal solution collection ditches spaced on 200-foot centers. Six-inch diameter hydraulic relief pipes, placed within a 12-inch thick overliner blanket, are spaced on 100-foot centers to maintain low hydraulic heads on the leach pad liner system. The clay used to construct the pad liner originates from the borrow source to the southwest of the Crofoot Project. Due to the inability of the available clay to achieve the required permeability, it was amended with 5% bentonite during construction.

In April 2013, the Permittee submitted an EDC proposing to construct a pond in an inactive portion of the Phase I heap leach pad for use as storage for fresh water to be used for process make-up and firefighting supply. The pond is designed to measure approximately 240 feet by 240 feet with a maximum operating capacity of approximately 2.2 million gallons. The liner system consists of a 12-inch thick prepared subbase overlain by an 80-mil high density polyethylene (HDPE) liner. Pipe outlets are embedded at the base of the pond in a concrete block with HDPE panels embedded in the top surface to allow welding of the 80-mil liner thereon. In the event of overfilling, overflow pipes will convey excess water to the Brimstone pipe containment channel at the toe of the heap leach pad. The EDC was approved by the Division in May 2013.

The downgradient main solution collection ditches of Phase I are lined with 80-mil primary and 40-mil secondary HDPE geomembrane overlying a 4-inch soil bedding layer compacted to 95% of Standard Proctor per American Society for Testing and Materials (ASTM) Method D698. One-inch diameter perforated polyvinyl chloride (PVC) leak detection pipes, which daylight at the pregnant pond (LP1 and LP2), are located between the primary and secondary ditch liners.

The liner system for Phase II consists of a 1-foot thick low permeability soil layer, compacted to 95% of Modified Proctor per ASTM D1557 to achieve a maximum permeability of $1x10^{-6}$ cm/s, overlain by an 80-mil HDPE liner with internal solution collection ditches spaced 200 feet apart. Drainage of the 3-foot thick overliner is facilitated by 4-inch diameter perforated PVC pipes placed at intervals of 35 feet.

The downgradient main solution collection ditches of Phase II are constructed of 80-mil primary and 60-mil secondary HDPE liners placed on a 12-inch soil layer, compacted to 95% of Modified Proctor per ASTM D1557 to achieve a maximum permeability of $1x10^{-6}$ cm/s, and traced with 1-inch diameter perforated leak detection pipes between the primary and secondary liners, which daylight in the Phase I solution channel (LP3, LP4 and LP5).

The Phase II heap height was initially permitted to a maximum of 200 feet above the synthetic liner. The major modification of December 2011 included a revised stability analysis which demonstrated that increasing the heap height to 400 feet was possible while maintaining the required factors of safety for static and pseudostatic conditions. This proposal was approved by the Division in September 2012.

The High Pregnant Pond, Low Pregnant Pond, Barren Pond, and DE Settling Pond are hydraulically connected via transfer channels and each has a maximum operating volume of 2.65 million gallons. Sufficient free volume will be maintained in the operating ponds at all times to accommodate runoff from the leach pad resulting from the 25-year, 24-hour storm event while still maintaining a minimum 2 feet of freeboard.

Each pond has a 60-mil HDPE primary and secondary liner with geonet located between the liners to transfer leakage to a dedicated leak detection sump. Each of the 2-foot deep gravel-filled sumps is routinely monitored and evacuated via a 4-inch diameter PVC pipe, which is perforated in the sump and daylights above the embankment crest. In the case of the DE Settling Pond, the 4-inch diameter pipe daylights into the barren pond. The working volume of the High Pregnant Pond sump is 280 gallons for the Low Pregnant Pond 1,050 gal, for the Barren Pond 280 gal, and for the DE Settling Pond 240 gal.

The 4 million-gallon Emergency Overflow Pond, which served as a pregnant pond for the Lewis Project, provides additional containment of process solutions, if needed. This synthetically-lined pond is hydraulically connected to the Low Pregnant Pond via two 16-inch diameter pipes. In 2009, the Emergency Overflow Pond was relined with 80-mil primary and 60-mil secondary HDPE liners, with a geonet in between for solution conveyance. The leak detection sump has a fluid volume of 1,030 gallon and can be inspected and evacuated through a 4-inch diameter PVC riser that daylights above the embankment crest.

In October 2009, the Permittee submitted an EDC for the addition of a pumping system to convey process solution from the Low Pregnant Pond to the Phase II area of the Brimstone Heap Leach Pad. The pumping system consists of a 45-horse power (hp) barge pump in the Low Pregnant Pond, a 350-hp centrifugal booster pump mounted on a concrete pad adjacent to the Low Pregnant Pond, and a 14-inch diameter schedule-40 welded steel pipeline from there to the top of the Phase II heap leach pad. This modification was approved by the Division, but construction has not yet been completed as of May 2020.

In May 2011, the Permittee submitted an application for major modification of the Permit proposing to rebuild the Lewis Heap Leach Pad on the same footprint and resume leaching. This requires the removal of old heap ore, which has been used as construction fill, blast hole stemming, and road base, as well as for overliner material on new leach pad synthetic liners.

The Lewis Heap Leach Pad was constructed in 1983 as part of the original mine operation. Active leaching continued until 1998 when the leach pad went into closure, and the heap was rinsed prior to permanent closure in 2005. Characterization of the spent leach material after rinsing using the Meteoric Water Mobility Procedure (MWMP) showed exceedances of the Division Profile I reference values for arsenic (0.15 milligrams per liter (mg/L)) and selenium (0.35 mg/L). These results were similar to those obtained from MWMP leachate from native soil samples. Based on these results, and considering the low precipitation received at the site and depth to groundwater (over 800 feet below ground surface), the Division determined that the use of the leach pad material as construction fill, blast hole stemming, and road base on the mine site will not degrade waters of the State.

The new Lewis Heap Leach Pad covers an area of approximately 2.7 million square feet. The leach pad is located directly adjacent to the northern side of the Brimstone Heap Leach Pad with the liner systems of each joined into one continuous system. This liner system consists of a minimum 12-inch layer of compacted soil achieving a permeability of $1x10^{-6}$ cm/s or less, overlain by an 80-mil HDPE geomembrane which, in turn, is covered by a minimum 36 inches of overliner material.

The Lewis heap height was initially permitted to a maximum of 200 feet above the synthetic liner. The major modification of December 2011 included a revised stability analysis which demonstrated that increasing the heap height to 400 feet was possible while maintaining the required factors of safety for static and pseudostatic conditions. This proposal was approved by the Division in September 2012.

The base of the leach pad is divided into three cells running from southeast to northwest. Each cell is graded to direct solution flow to the center line of the cell where it is then conveyed to the northwest edge of the pad. Solution drainage is aided by the placement of 4-inch diameter perforated corrugated plastic pipe (CPP) in a herringbone pattern feeding into 12-inch or 18-inch diameter perforated CPP header pipes which run to 18-inch diameter solid CPP solution conveyance pipes in the lined channel on the northwest edge of the pad. The southern end of the solution pipe system collects solution from Cell 3 and then joins the Brimstone solution pipes discharging to the Pregnant Pond. The northern end of the solution pipe system collects solution from Cells 1 and 2 and discharges to the Pregnant Sump from where it is pumped to the Low Preg Pond and/or the Overflow Pond. Barren and lean solution is delivered to the heap in 16-inch diameter steel pipes which lie in the same lined channels where the 18-inch pregnant solution conveyance pipes are located.

The lined channels include 12-inch diameter perforated CPP leak collection pipes which are located below the underliner and encased in sand. Fugitive solution in the southern portion of the channel is conveyed to the Pregnant Pond inlet channel where the pipe end is visible for routine inspection for leakage. In the northern portion of the channel, the leak detection pipe daylights within the concrete Pregnant Sump where the pipe end overhangs the sump wall where it can be easily inspected for leakage. The Pregnant Sump, in turn, also has a leak detection riser which provides access to inspect and evacuate the area around the concrete basin if necessary.

In order to collect the additional stormwater volume resulting from direct precipitation on the Lewis Heap Leach Pad during the 100-year, 24-hour storm event, an event pond was constructed immediately north of the existing Overflow Pond. The new pond has a 7.7 million gallon capacity at 2 feet of freeboard, and 8.9 million gallons at the crest. The liner system consists of an 80-mil HDPE liner placed over a 6-inch soil bedding. Residence time of any process solution entering the pond due to an upset condition is limited by the Permit to 20 days for each event.

In March 2012, the Permittee submitted an EDC which, while retaining the permitted solution pumping rate to the Brimstone (Phase I and Phase II) and Lewis heap leach pads at 8,000 gallons per minute (gpm) each, proposed to increase the total combined permitted application rate to 12,000 gpm. This increase would require additional pond capacity to contain the fluid volume resulting from the 25-year, 24-hour and 100-year, 24-hour storm events. In order to address this, the same EDC proposed a pipeline from the Brimstone Event Pond to the Crofoot Overflow Pond to allow transfer of excess fluid to the latter in the case of a large storm event. (The Crofoot Overflow Pond was transferred to the Brimstone Permit by EDC in December 2009.) The EDC was approved by the Division in May 2012.

In July 2013, the Permittee submitted a similar EDC proposing an increase in the heap leach pad solution application rates as follows: Brimstone (Phases I and II combined) maximum 12,000 gpm; Lewis maximum 11,000 gpm; Brimstone and Lewis combined maximum 16,000 gpm. Calculations submitted with the EDC confirmed that the process, piping, and pond systems were able to manage process and storm flows under these conditions. The EDC was approved by the Division in August 2013.

In June 2013 the Permittee submitted an EDC proposing to inject barren and/or lean pregnant solution into a total of 15 wells each on the Brimstone and Lewis leach pads. The design calls for injection by gravity only and the overall application rate by all methods to both heap leach pads will not exceed the present Permit limits as described in the previous paragraph. Analyses of each leach pad under worst case conditions of the injection system confirmed that the stability of each will not be compromised by the operation. The EDC was approved by the Division in July 2013.

The Crofoot Overflow Pond has a capacity of 13 million gallons at 2 feet of freeboard. The original 40-mil HDPE liner was replaced in April 2012 with 80-mil HDPE. As a single-lined pond, residence of solution introduced during a storm event is limited to 20 days.

The proposed transfer pipeline is a single-walled 16-inch diameter HDPE construction, primarily above-ground but with three areas where it must be buried to pass under haul road crossings. These crossings also form low points where fluids will not completely drain by gravity.

In order to prevent process solution from remaining in the pond or in low points of the pipeline beyond the 20-day limit for single-lined containments, fresh water will be introduced into the Crofoot Overflow Pond and pumped up to the Brimstone Event Pond until samples of the outflow show less than 0.20 mg/L WAD cyanide. This will ensure that the low points in the pipeline and the pond itself will only contain fresh water when pumping is complete.

The Brimstone process plant is designed to prevent leaks or spills from entering the environment. If process solution escapes primary containment within the building, it will gravity flow via an 18-inch diameter HDPE pipeline into either the DE Settling Pond or the Barren Pond, which provide secondary containment greater than 110% of the largest vessel volume. The caustic soda and sodium cyanide tanks, located adjacent to the process ponds, are also located within secondary containment with a volumetric capacity greater than 110% of the largest tank volume.

As part of the December 2010 minor modification application, the Permittee proposed expansion of the Merrill-Crowe process building to include an additional clarifier, deaeration tower, filter press, and associated appurtenances. Additional concrete containment in the area of the proposed deaeration tower was included in the design, with waterstops and sealants provided at all concrete joints. In addition, the Permittee submitted an EDC in April 2013 to add a fourth clarifier, for operational flexibility, within the new containment area. The EDC was approved by the Division in April 2013.

In August 2012, the Permittee submitted an EDC proposing the addition of a 5-ton atmospheric strip circuit adjacent to the southwest portion of the Brimstone Heap Leach Pad. A new anti-scalant tank is located adjacent to the Brimstone Settling Pond. The strip circuit is designed for a processing rate of 80 gpm of loaded carbon from the carbon in column (CIC) circuits. Pregnant solution from the strip circuit is pumped to the Brimstone Merrill-Crowe Plant. The strip circuit is located on an 80-mil HDPE liner system which is sloped to drain into the Brimstone Heap Leach Pad solution collection channel in the event of leakage. The EDC was approved by the Division in August 2012.

Some pregnant solution may be diverted to one of two CIC circuits rather than the Merrill-Crowe process plant. Each CIC circuit consists of five carbon columns through which process solution is pumped counter-current to the carbon. The CICs have a total capacity to process up to 1,500 gpm. Barren solution at each exit is released to the DE Settling Pond and loaded carbon is transferred to the strip circuit for gold recovery and carbon reactivation. The Brimstone Heap Leach Pad 80-mil HDPE liner provides secondary containment for each CIC circuit.

In February 2013, the Permittee submitted an EDC proposing to add a second set of two CIC circuits. The new CICs have a capacity to process 5,000 gpm. As with the existing CICs, the new circuit would release barren solution to the DE Settling Pond and all loaded carbon would be transferred to the strip circuit for gold recovery and carbon reactivation. The new CIC circuits would also be located on the Brimstone Heap Leach Pad, the liner of which would provide secondary containment. The EDC was approved by the Division in February 2013.

Two riprap-lined diversion v-ditches will direct runoff resulting from the 100-year, 24-hour storm event away from the process components. One ditch is located on the north side of the Brimstone Phase I (temporary) and the other will be located on the east side of the Brimstone Phase II Heap Leach Pad (permanent).

In June 2015, the Permittee submitted an EDC to temporarily place a skid-mounted mill demonstration plant (MDP) on the central portion of the Brimstone Vista Heap Leach Pad. The foot print of the MDP is 3,900 square feet of the 19 million square foot Brimstone leach pad facility. The MDP and associated facilities, which include the plant, stockpile, and parking, comprise an area of approximately 86,000 square feet. While the MDP is under construction and operation leaching will be ceased in the general area which reduces the solution application to the pad by 144 gpm. The solution discharge from the MDP to the leach pad is expected to be 1.4 gpm and is of similar quality to the barren solution discharged from the Merrill-Crowe plants on the site. Operational flow rate of the MDP is 4.2 gpm.

Site grading directs meteoric water generally to the south east from the plant pad ultimately arriving in the existing DE pond. Tailings slurry generated from the milling operation will also be placed in the DE pond for storage and possible future processing. Approximately 184,000 total gallons of solution will be discharged during the initial 90-day operating cycle.

The 10-ton per day MDP employs grinding, sulfide flotation, concentrate regrind, oxidation of the sulfide concentrate using a atmospheric alkaline oxidation process, cyanide leaching in vats, standard five stage counter-current decantation, Merrill-Crowe gold and silver recovery, and solution reclaim.

Minimal amounts of reagents used in the MDP are similar to heap leach processing reagents currently in use at the site. These reagents include: potassium amyl xanthate (PAX), methyl iso-butyl carbinol (MIBC) and Areo® 404, sodium sesquicarbonate (trona), sodium cyanide (NaCN), high calcium quick lime (CaO), zinc dust, Hyperfloc® AF 303, Zalta™ MA11-130, and Flomin® C-3505, C-7220, and F-500.

The MDP initially processed three regimes of ore: Brimstone sulfide ore was run through the MDP first, followed by Central sulfide ore, and then Bay sulfide ore. Approximately 320 tons of each ore tested has been mined, sampled, and stockpiled. Each regime of ore took between four and five weeks to process with the complete test to last approximately three months. After the initial test the equipment was mothballed at the testing location. Future testing that is not in the exact configuration of the design described in the June 2015 EDC application will require Permit modification and applicable fees.

The EDC was approved by the Division in August 2015.

North Process Area

The 6.8 million square foot North Heap Leach Facility (NHLF) was constructed in a single phase consisting of a total of 10 cells. Crushed ore is stacked in nominal 35-foot high lifts to a maximum height of 400 feet measured vertically from the top of the synthetic liner. Stability analyses of the heap at this design height was carried out and results predicted static and pseudostatic factors of safety which exceeded the Division minimum requirements. In addition, a displacement analysis was included which resulted in a worst case predicted lateral movement of 2 inches under design seismic conditions.

The liner system design for the NHLF consists of a one-foot thick, low permeability soil layer ($1x10^{-6}$ cm/s) overlain by an 80-mil HDPE geomembrane liner. Solution is conveyed in 4-inch diameter perforated HDPE collection pipes, placed on 50-foot centers, leading to 8-, 10-, 12-, and 15-inch diameter perforated HDPE secondary collection pipes. These lead to 18-inch solid HDPE primary collection pipes for conveyance to the process area. The collection pipes are covered with a 24-inch layer of free-draining overliner material for protection.

The solution collection channels in which the secondary collection pipes lie include a leak detection system below the 80-mil HDPE liner. A 2-inch perforated PVC pipe runs parallel to the channel, with 4-inch solid PVC pipes leading to leak detection risers at eight locations around the heap (NLP1-8).

In March 2013, the Permittee submitted an EDC proposing a temporary piping system to convey pregnant solution from the North Heap Leach Pad to the Brimstone Merrill-Crowe facility. The pipeline would consist of 22- and 24-inch diameter HDPE pipe which would lay in existing lined ditches for secondary containment. The piping system was retained until the North area Merrill-Crowe facility was constructed. The EDC was approved by the Division in April 2013.

In July 2013, the Permittee submitted an EDC proposing an increase in the North Heap Leach Pad application rate to a maximum of 14,000 gpm. Calculations submitted with the EDC confirmed that the process, piping, and pond systems were able to manage process and storm flows under these conditions. The EDC was approved by the Division in August 2013.

In December 2013, the Permittee submitted an EDC proposing to further increase the North Heap Leach Pad application rate to a maximum of 16,000 gpm. Calculations submitted with the EDC confirmed that the process, piping, and pond systems were able to manage process and storm flows under these conditions. The EDC was approved by the Division in January 2014.

The North Pregnant Pond, North Barren Pond, and two DE Settling Ponds (east and west) are hydraulically connected via transfer channels. The Pregnant and Barren ponds each have a maximum storage volume of 3.7 million gal. The DE Settling Ponds each have a maximum storage volume of 1.05 million gal. Each of these ponds is constructed with side slopes of 3 horizontal to 1 vertical (3H:1V) with spillways connecting them hydraulically. Each pond has a liner system consisting of, from bottom to top, 12 inches of compacted soil (permeability $1x10^{-5}$ cm/s or less), an 80-mil HDPE secondary liner, geonet, and an 80-mil HDPE primary liner. Each pond includes a leak detection and recovery sump (2,200 gallon capacity) at the low point, with a 10-inch diameter PVC pipe extending from the sump, where the submerged portion is slotted, to the crest of the pond to allow inspection and evacuation if necessary.

The North Barren Pond includes a spillway leading to the North Event Pond to allow overflow of excess fluid in the event of a large storm. The North Event Pond has a liner system consisting of, from bottom to top, 12 inches of compacted soil (permeability $1x10^{-5}$ cm/s or less) and an 80-mil HDPE liner. The total storage capacity of the pond at the bottom of the invert is 15.8 million gal. As a single-lined pond, impoundment of process solution is limited to 20 days for each event.

Barren and lean solutions are delivered to the heap leach pad from the North Barren Solution Vault. The vault consists of a concrete slab and wall system approximately 22.5 feet across by 34 feet long and 18 feet deep, constructed over 2 feet of drain gravel, which in turn sits on an 80-mil HDPE secondary liner. An 8-inch diameter PVC riser pipe extends from the drain gravel through the backfill around the vault, and daylights above finished grade to allow inspection and evacuation of fluid if necessary. The vault receives barren solution from the process building and, if necessary, from the Barren Pond, and lean solution from the heap leach pad. Three vertical turbine pumps deliver the barren/lean solution to the heap leach pad through the 24-inch diameter steel main header pipe. The vault is designed to overflow back into the Barren Pond.

Pregnant solution is delivered to the process building from the North Pregnant Solution Vault. The vault consists of a concrete slab and wall system approximately 12.7 feet across by 28 feet long and 18 feet deep, constructed over 2 feet of drain gravel, which in turn sits on an 80-mil HDPE secondary liner. An 8-inch diameter PVC riser pipe extends from the drain gravel through the backfill around the vault, and daylights above finished grade to allow inspection and evacuation of fluid if necessary. The vault receives pregnant solution from the heap leach pad and, if necessary, from the Pregnant Pond. Two vertical turbine pumps deliver the pregnant solution to the process building through the 26-inch diameter steel main header pipe. The vault is designed to overflow back into the Pregnant Pond.

A reagent storage pad will be located at the west end of the west DE Settling Pond. The pad will consist of a concrete slab with 12-inch containment curbs on three sides. The fourth side is left open to allow leakage to flow directly into the DE Settling Pond. A continuous cast-in-place HDPE welding strip was embedded into the slab edge which faces the DE Settling Pond to allow welding of the pond primary HDPE liner for a continuous flow path onto primary containment. Two tanks will be placed on the pad – an anti-scalant tank and a cyanide storage tank.

North Merrill-Crowe Facility

The Permittee submitted a minor modification application in December 2012 proposing the addition of a Merrill-Crowe facility at the North Process Area (NMCF). The plant footprint as designed measures approximately 468 feet by 280 feet and is located directly east of the north Pregnant Pond and DE Settling Pond. Pregnant solution from the NHLF and SHLF is pumped to the low grade PLS tank where it is mixed with pregnant solution from the decantation circuit. Solution from the PLS tank is then pumped through pressure filters to reduce solids to less than 1 part per million.

Clarified solution is then conveyed to the top of the 29-foot diameter by 47-foot high deaeration tower and distributed over a bed of packing, thereby providing surface area for thin film formation and release of dissolved oxygen. Deaerated solution flows by gravity from the tower to the suction side of the precipitate filters. Zinc powder is metered into the solution at the inlet using a screw feeder and the pumps deliver the mixture to three sets of precipitate filters.

Solution exiting the filter system is discharged to the barren solution tank from which it is redistributed to the heap leach pad, to the clarifying filters for use as sluicing solution, to the diatomaceous earth mix tanks, or to the leach circuit and cyanide destruction tank. Precipitate from the filters is taken to the furnace area for precious metal separation.

Secondary containment for the process building is provided by a series of concrete slab and stem-wall systems, the design of which includes appropriate sealants and waterstops at concrete joints. The clarifying filter area is a self-contained system which includes a floor trench and sump to collect and evacuate any spillage. The precipitate filter and retort areas both drain through floor trenches to a sump from which any solution accumulations can be evacuated.

The solution handling area, which includes the pregnant solution, barren solution, cyanide, and cyanide destruct tanks, as well as the deaeration tower, is designed with sloping floors which direct spillage to a central sump from which it can be evacuated. In the event of large spills, solution will report to an overflow sump which is drained by eight 12-inch diameter pipes which convey solution to the Pregnant Pond. The cyanide off-load area is immediately adjacent to the solution handling area and incorporates sloping concrete surfaces and a central sump to contain and allow evacuation of any spillage during the delivery process.

The natural topography of the site around the North Area Process Facility results in the natural conveyance of stormwater around and away from the process components. Minor stormwater flows which run toward the site will be managed by the construction of berms and v-ditches to direct those flows away from the heap leach pad and pond areas.

Barren solution from the NMCF reports to either the barren solution vault at the NHLF for recirculation to the heap leach pad, directly to the SHLF pad, or is returned to the mill for use in concentrate and tails leaching. Upon reaching pre-determined certain operating parameters, the clarifiers are cleaned. Solution from the cleaning process reports to the mill circuit.

The minor modification for the NMCF was approved by the Division in May 2013. Construction of the NMCF was completed in September of 2013.

Brimstone – North Heap Leach Facility

In September 2014, the Permittee submitted a minor modification to expand the Brimstone-North Heap Leach Facility (BNHLF) to the Southeast by approximately 74 acres including an additional Event Pond at the existing North Area Merrill-Crowe facility. The minor modification was approved by the Division in March 2015.

The 3.2 million square foot BNHLF is to be constructed in a two phases consisting of three cells each and is designed to have a capacity of 28.6 million tons of ore. Lime conditioned crushed ore will be stacked in nominal 35-foot high lifts to a maximum height of 400 feet measured vertically from the top of the synthetic liner. Each lift is initially stacked with the face at the angle of repose and 33-foot wide benches at the top of each lift to an overall side slope of 2.5H:1V. Weak cyanide solution is applied at a maximum application rate of 0.005 gpm per square foot over all or only at portion of the new lined area of 3.2 million square feet. As an expansion to the North Area Heap Leach Pad, the BNHLF is subject to the limitation of the North Heap Leach Pads overall maximum application rate of 16,000 gpm. Stability analyses of the heap at the design height of 400 feet was carried out and results predicted static and pseudostatic factors of safety of 1.4 and 1.0 respectively.

The liner system design for the BNHLF consists of a 1-foot thick, low permeability soil layer with a maximum hydraulic conductivity of $1x10^{-6}$ cm/s compacted in two 6-inch thick lifts overlain by an 80-mil HDPE double-sided Microspike® geomembrane liner. Solution is collected and conveyed in 4-inch diameter perforated HDPE collection pipes, placed on 100-foot centers, leading to 6-, 8-, 12-, and 15-inch diameter perforated HDPE secondary collection pipes. The collection pipes are covered with an 18-inch layer of free-draining material for protection.

These lead to 15-, 22-, 26-, 30-, and 36-inch solid HDPE primary pipes for conveyance to the Merrill-Crowe process area in the solution channel. The solution collection channel in which the secondary collection pipes lie includes a leak detection system below the 80-mil HDPE liner. A 2-inch diameter perforated PVC pipe runs parallel to the channel, with 4-inch solid PVC pipes leading to leak detection risers.

Depth to groundwater in the vicinity of the BNHLF as observed in the nearest monitoring wells is 380 feet at H10HR-011 located approximately 2,200 feet to the southwest and 430 feet at H10HR-006 located approximately 1,500 feet to the northeast.

The initial analysis indicated that the BNHLF required an additional Event Pond. This pond was to be constructed north of the ponds at the North Merrill-Crowe Facility. The Brimstone-North HLF Event Pond (BNEP) was designed to have a liner system consisting of, from bottom to top, 6 inches of compacted soil and a single 80-mil HDPE single-sided textured liner. The total storage capacity of the BNEP is designed to be 13 million gallons. As a single-lined pond, impoundment of process solution is limited to 20 days for each event. The BNEP is designed to be connected to the Merrill-Crowe Event Pond by a lined channel so that flow can overflow from one to the other as needed. The total storage volume of the combined pond system is designed to be 41.6 million gallons which will contain the volume from the 100-year storm with a 12-hour draindown. An EDC was submitted to the Division in April 2015 to correct the BNHLF water balance to the total application rate to the North Area Heap Leach Pad and the BNHLF to be a total of 16,000 gpm. In addition, the EDC demonstrated that the BNEP was not needed. The EDC was approved in August 2017 with the approval of the 2017 Permit renewal.

An inactive fault, termed the East Fault runs in a north-south trend following the orientation of the natural topography (north- to north-east striking) along the western aspect of the adjacent Kamma mountain range. The East Fault is defined as a Quaternary fault (less than 1.6 million years old) by the U.S. Geologic Survey (USGS) (2006) with an average slip rate of 0.2 millimeters per year. The national probabilistic seismic hazard analysis performed by the USGS does not include the East Fault as a seismic source.

A field investigation was completed to evaluate a surface crack that was observed by NewFields personnel during a site visit on 20 September 2013 on the slope of the proposed pad expansion.

The location of this crack is approximately 150 feet east of the east toe of the Brimstone HLF approximately 100 feet east of the alignment of the primary solution collection pipeline for the BNHLF running parallel to the pipeline for the entire length.

The investigation consisted of excavating test pits, visually observing the subsurface conditions, and collecting bulk samples for laboratory testing to characterize near surface soils.

The following conclusions can be made based on the report by Michael West and Associates, the AMEC Seismic Hazard Assessment, recent test pits, and historic field investigation programs that have been completed in the adjacent leach pad areas.

- The national probabilistic seismic hazard analysis performed by the USGS in 2008 does not include the East Fault as a seismic source.

- The East Fault is considered inactive based on the evidence and conclusions provided in the Michael West report, "Review of Seismogenic Potential of the Kamma (East) Fault and Design Ground Motions, Proposed Heap Leach Facilities, Hycroft Mine" dated 18 December 2012. This report was submitted with the Knight Piesold design report for WPCP NEV0094114 major modification Application, Volume III of III dated 31 January 2013.

- It is NewFields opinion that the crack was caused by ore loading and elastic settlement of the soil profile beneath the adjacent Brimstone, Lewis, and North leach pads immediately west of the proposed expansion. The elastic settlement resulted in a zone of tension adjacent to the soil-bedrock contact, resulting in a surficial crack paralleling the fault. Infiltration of precipitation (rain and snow) into the crack has resulted in erosion of surface silty soils and has widened the crack at the surface.

- Ore loading in the proposed expansion area will place the subsurface soils under a significant compressive load. Crack propagation is not possible when soils are under compression.

- The pad expansion area is in an area with a relatively steep slope that will provide accelerated solution drainage. This will facilitate minimal head on the lining system.

As a precaution, the native ground beneath the surface crack will be over-excavated to bedrock or up to 15 feet deep and replaced with compacted random fill material. A thickened section (2-feet) of gravel material will be placed in the zone extending 10 feet on either side of the previously identified crack location to provide a more robust composite lining system in this area. As of May 2020 the BNHLF has not been constructed.

South Combined Process Area

In January of 2012, the Permittee submitted a major modification that included construction of a heap leach facility on the south extent of the property. The facility was referred to as the South Heap Leach Facility (SHLF). The major modification was approved by the Division in September 2012. Then the Permittee submitted another major modification in March of 2013 to construct a combined heap leach and tailings storage facility, referred to as the South Processing Complex (SPC), in the same location as the previously permitted SHLF. The 2013 major modification superseded the portion of the previous major modification pertinent to the SHLF. The SPC uses the new SHLF, constructed in a horse shoe shape, to provide the embankment for the TSF located in the central portion of the new SHLF. Subsequent reference to the name SHLF will refer to the facility described in the 2013 major modification.

South Heap Leach Facility

The 25 million square foot SHLF is to be constructed in multiple phases consisting of a total of 25 interior cells to hold approximately 139 million tons of ore. Run-of-mine ore hauled directly from the open pits will be stacked in nominal 35-foot high lifts to a maximum height of 270 feet measured vertically from the top of the synthetic liner or an elevation of 4,340 feet above mean sea level (amsl). The general shape of the SHLF will approximate a horse shoe to provide the structural embankment for the placement of tailings from the Mill Facility. Ore stacking is sequenced to allow for leaching of the facility while simultaneously providing safe containment of the tailings. A stability analysis of the heap at the 4,340-foot amsl design elevation was carried out and results predicted static and pseudo-static factors of safety which exceeded the Division minimum requirements. In addition, a displacement analysis was included which resulted in a worst case predicted lateral movement of 1.5 inches under design seismic conditions.

The liner system design for the SHLF consists of three types of permeability layers that will be overlain by an 80-mil thick double-side textured linear low density polyethylene (LLDPE) geomembrane liner. This liner will tie directly into the TSF composite liner system:

- Type III Low Permeability Layer will be used in the SHLF outlet channels where groundwater is less than 100 feet below the base of the soil layer. A bentonite amendment soil will be used to achieve a one-foot thick low permeability soil layer of $1x10^{-7}$cm/s if $1x10^{-6}$ cm/s material cannot be placed.

- Type II Low Permeability Layer will be used in the SHLF and TSF basin where the base of the low permeability layer is within 100 feet of the maximum observed ground water elevation and it will consist of a low permeability soil layer of $1x10^{-6}$ cm/s or less.
- Type I Low Permeability Layer will be used in the SHLF and TSF basin where the base of the low permeability layer is more than a 100 feet of maximum observed ground water elevation and it will consist of low permeability soil layer of $1x10^{-5}$ cm/s or less.

Solution is conveyed in 4-inch diameter perforated HDPE collection pipes, placed on 50-foot centers, leading to 8-, 10-, 12-, 15-, and 18-inch diameter perforated HDPE secondary collection pipes. These perforated collection pipes lead to 18-inch solid HDPE primary collection pipes and transition to 22-inch diameter HDPE pipes for conveyance to the process area. The collection pipes are covered with a 24-inch layer of free-draining overliner material for protection.

The solution collection channels, in which the secondary collection pipes lie, include a leak detection system below the 80-mil LLDPE liner. A 2-inch perforated PVC pipe runs parallel to the channel, with 4-inch solid PVC pipes leading to leak detection risers at eight locations around the heap (SLP1-8).

The South Pregnant Pond, South Lean Pond, and the Event Pond are hydraulically connected via transfer channels. The Pregnant and Lean ponds have a combined maximum storage volume of 22.4 million gal. Each of these ponds are constructed with side slopes of 2.5H:1V with spillways connecting them hydraulically. Each pond has a liner system consisting of, from bottom to top, 12 inches of compacted soil (permeability $1x10^{-5}$ cm/s or less), a 60-mil HDPE secondary liner, geonet drainage layer, and an 80-mil HDPE primary liner. Each pond includes a leak detection and recovery sump (2,400 gallon capacity) at the low point, with a 10-inch diameter PVC pipe extending from the sump, where the submerged portion is slotted, to the crest of the pond to allow inspection and evacuation if necessary.

The South Lean Pond includes a spillway leading to the South Event Pond to allow overflow of excess fluid in the event of a large storm. The South Event Pond has a liner system consisting of, from bottom to top, 12 inches of compacted soil (permeability $1x10^{-5}$ cm/s or less), a 60-mil HDPE secondary liner, geonet drainage layer, and an 80-mil HDPE liner. The total storage capacity of the pond at the bottom of the invert is 46.7 million gal. The Event Pond is designed to have the capacity to contain the volume of the 100-year, 24-hour precipitation event, upset condition draindown, and the upset condition pipe drainage volume combined.

Barren and lean solutions are delivered to the heap leach pad from the South Barren Solution Vault at a maximum permitted rate of 10,000 gpm. The vault consists of a concrete slab and wall system approximately 22.5 feet across by 34 feet long and 18 feet deep, constructed over 2 feet of drain gravel, which in turn sits on an 80-mil HDPE secondary liner. An 8-inch diameter PVC riser pipe extends from the drain gravel through the backfill around the vault, and daylights above finished grade to allow inspection and evacuation of fluid if necessary. The vault receives barren solution from the process building and, if necessary, from the Barren Pond, and lean solution from the heap leach pad. Three vertical turbine pumps deliver the barren/lean solution to the heap leach pad through the 24-inch diameter steel main header pipe. The vault is designed to overflow back into the Barren Pond.

Pregnant solution is delivered to the process building from the South Pregnant Solution Vault. The vault consists of a concrete slab and wall system approximately 20 feet across by 45 feet long and 17 feet deep, constructed over 2 feet of drain gravel, which in turn sits on a 60-mil HDPE secondary liner. An 8-inch diameter PVC riser pipe extends from the drain gravel through the backfill around the vault, and daylights above finished grade to allow inspection and evacuation of fluid if necessary. The vault receives pregnant solution from the heap leach pad and, if necessary, from the Pregnant Pond. Three vertical turbine pumps deliver the pregnant solution to the process building through the 30-inch diameter steel main header pipe. The vault is designed to overflow back into the Pregnant Pond. Processing of pregnant solution will be carried out either in a future dedicated facility at the South Processing Area or by pumping the solution to the North Merrill-Crowe Facility

The local topography east and south of the SHLF rises significantly, resulting in a large watershed area directed at the heap leach pad. In order to divert stormwater flows around the heap leach pad and process area and into natural drainages to the west of the facility, stormwater diversion channels are included in the design around the south, east and north sides of the area. The channel is designed with a trapezoidal cross-section ranging from 3 feet to 5 feet in depth and 6 feet to 8 feet in width (flat bottom width). All channels are protected from erosion by placement of riprap on the bottom and sides. Hydraulic calculations of the channel capacity show that it is capable of diverting flows resulting from the 100-year, 24-hour storm event.

Tailings Storage Facility (TSF)

The TSF will be constructed and filled in stages after the SHLF has enough ore staged on the upstream face to 4,235 feet in year 2. Tailings material will be deposited via two parallel delivery pipes that have a series of take-off drop bars. The drop bars will be located at the crest of the SHLF embankment and will be operated in series to spread the tailings in thin layers to limit velocity and erosion. The deposition will occur along the north, west, and south SHLF embankment. As the embankment advances, the locations of tailings delivery will be rotated to create a drained beach area/supernatant pond along the eastern side of the TSF. The supernatant pond will range from 2 to 4 feet in depth during tailings deposition and be separated from the SHLF by an 80-mil double-side textured LLDPE geomembrane liner. The liner will be constructed on the upstream face of the SHLF.

The entire floor of the TSF will be lined with composite soil and geomembrane liner that will be continuous from the SHLF as described previously. An underdrain will be installed above the liner system to intercept both decanted supernatant pond water and underdrain from the tailings material that will be collected in a downstream pond for use in milling. The underdrain will consist of 4-inch perforated corrugated polyethylene tube (CPT) collector and conveyance pipes spaced at 52-foot intervals and surrounded by free-draining material. The supernatant will decant along the center of the TSF basin. The pipe network will discharge into an 8- to 24-inch diameter main collection pipe. A 12-inch thick and 40 feet wide erosion/ultra-violet light protection cover layer will be installed over a portion of the filter fabric in the TSF basin to prevent damage from erosion and ultra-violet rays. The section will extend along the upstream toe of the SHLF.

A backup decant system with a filter fabric cover, will be installed in case of emergency that will include four 18-inch diameter perforated CPT pipes placed in the channel and covered in filter gravel. The CPT pipes will transition to a solid 36-inch diameter pipe to convey flow to the TSF basin outlet pipe system.

The TSF basin will have an outlet pipe system that runs underneath the SHLF. In order to protect this system, the outlet pipes will be constructed in three segments with 36-inch diameter solid HDPE pipes in reinforced concrete and the middle section will consist of 36-inch diameter solid HDPE covered fill material and drain gravel. 4-inch diameter perforated CPT pipe will be installed in the drain gravel as a relief system for any leaks of the 36-inch diameter HDPE pipes. Lastly, the TSF basin outlet pipes will be placed in lined trenches wrapped with HDPE geomembrane for additional containment.

Decant and underdrain solution from the TSF is delivered to operations as makeup water from the Tailings Seepage/Reclaim Water (TSR) Vault. The vault consists of a concrete slab and wall system approximately 20 feet across by 67.4 feet long and 17 feet deep, constructed over 2 feet of drain gravel, which in turn sits on a 60-mil HDPE secondary liner. An 8-inch diameter PVC riser pipe extends from the drain gravel through the backfill around the vault, and daylights above finished grade to allow inspection and evacuation of fluid if necessary. Three vertical turbine pumps deliver the reclaim water to the process circuit through the 30-inch diameter steel main header pipe. The vault is designed to overflow back into the TSR Pond through an overflow weir. The pond is intended to be a zero discharge system sized to handle runoff from the 100-year, 24-hour storm. Any excess precipitation will be stored in the TSF and the release will be controlled with the downstream throttling valves.

The TSR Pond has a liner system consisting of, from bottom to top, 12 inches of compacted soil (permeability $1x10^{-5}$ cm/s or less), a 60-mil HDPE secondary liner, geonet drainage layer, and an 80-mil HDPE liner. The total storage capacity of the pond at the bottom of the invert is 54.7 million gallons and is constructed with side slopes of 2.5H:1V.

The tailings seepage and reclaim ponds, along with the SHLF pregnant and lean ponds, will have a leak collection and recovery system (LCRS) located in the primary liner. The LCRS under the ponds, will consist of a geonet located in between the primary and secondary geomembranes. A 12-inch diameter solid HDPE pipe sleeve extends from the crest of the pond to the bottom of a LCRS sump that the geonet drains to. Slots placed in the bottom 3 feet of the pipe will allow solution inflow that can then be pumped back into the respective pond.

Before the deposition of tailings begins, 1 billion gallons of water will be impounded for Mill start in the TSF. The impoundment will be supplied by groundwater supply wells and other existing sources onsite.

Mill and Process Facility Area

As part of the 2013 major modification application, a mill and related process facilities were proposed. High grade ore is processed through an approximately, 65,000 tpd Phase 1 concentrate milling circuit with a 132,000 tpd final phase capacity. Precious metal recovery using Merrill-Crowe precipitation will be conducted in the NMCF. The spent ore (tailings) is pumped to the TSF at the South Processing Complex. The processing flow sheet for the concentrate mill includes the following:

- Crushing;
- Grinding;
- Rougher flotation;
- Flotation product Atmospheric Alkaline Oxidation (AAO) Oxidation;
- AAO Oxidation product Leach;
- Merrill-Crowe metal recovery; and
- Refinery.

Crushing and Grinding

Ore is transported from the open pits to the gyratory primary crusher via haul trucks and end dumped into the gyratory crusher's dump pocket. Crushed ore is then conveyed via fixed stacker to a stockpile and subsequently to the grinding and milling circuit. The phase 1 grinding circuit consists of the following:

- One Semi-Autogenous Grind (SAG) mill;
- Two standard cone crushers as secondary crushers;
- Two short-head cone crushers to crush SAG screen oversize;
- Two ball mills;
- Two cyclone feed pumps; and
- Two cyclone clusters, one per ball mill.

One dedicated SAG mill feed conveyor deliver reclaimed crushed ore directly to the SAG mill feed chute. Mill water is added at this point to flush the ore into the SAG mill and provide a density of approximately 75% solids. SAG mill product from the mill is pumped to the ball mills and then cyclones. Cyclone overflow is pumped to the flotation circuit while underflow (oversize) is recirculated through the grinding circuit.

Flotation

Eighty percent passing (P_{80}) of 100-mesh grind from the ball mills is pumped to the flotation circuit for further processing and precious metals recovery. The flotation circuit consists of rougher flotation and concentrate regrind circuit.

Ball mill cyclone overflow is floated in four parallel rougher flotation trains. Each train contains six cells to treat the product from the grinding circuit. The feed flows are stepped by gravity through the four rougher flotation cells in the train. The flotation cells have submerged impellers that draw in air and shear it into very fine bubbles. The fine bubbles, with the aid of flotation reagents (frother and collector), contact and attach to the sulfide minerals and float to the surface. The floated sulfide minerals are captured in a stable froth which forms on the top of the flotation cell. Froth is continuously removed from the top of the cell via displacement, to produce a slurry containing both metal sulfides and waste known as concentrate. Each cell in the bank collects more concentrate until the feed is barren of recoverable sulfide minerals and considered to be tailings. Tailings are delivered to the TSF via two 24-inch combination HDPE and steel pipes. The rougher concentrate is reground in the concentrate regrind circuit.

The concentrate regrind circuit reduces the size of the rougher flotation concentrate liberating the sulfide minerals from gangue (waste material). From the regrind circuit the slurry is then pumped to the AAO system.

<u>AAO Oxidation</u>

Reground rougher concentrate is fed to the AAO circuit. This circuit exposes the regrind rougher concentrate slurry to oxygen though tank sparges, generated by an on-site oxygen plant, with trona added to neutralize the acid generated from the oxidation of the sulfides. This process allows surface oxidation of the sulfides and makes the gold and silver amenable to standard CN leach.

<u>Oxidized Concentrate Leach</u>

The oxidized concentrate slurry from the AAO system is then passed on to the Leach Circuit Thickener where sodium cyanide (NaCN) and lime are added. Pregnant solution is pumped to the NMCF and processed as described in the previous section titled *North Merrill-Crowe Facility*. Discharge from the leach circuit is pumped to the four stage counter-current decantation (CCD) thickener where the material is washed with low grade Merrill-Crowe barren solution (cyanide [CN] removed) to remove cyanide content, thickened to approximately 55% solids and pumped to the TSF.

Solutions containing residual levels of cyanide from leaching/recovery (i.e. barren solutions from the low grade Merrill-Crowe circuit) are returned to the leach circuit. The facilities include an acidification, volatilization and recovery (AVR) system designed for removing and recovering residual cyanide. The washed barren solution (CN removed) is utilized in the milling circuit during the CCD process described above. The recovered cyanide solution is reused in the leaching process.

<u>Building Containment</u>

Primary containment for process solutions is generally in tanks, ponds, or process equipment. All buildings and storage areas throughout the mill circuit that will house processing equipment (i.e., tanks, SAG mills, flotation cells), or reagents have been designed to contain spillage. Within a building, storage area, or curbed process area the secondary containment is provided by the engineered concrete floor and walls. The volume for each containment area is designed to hold at least 110% of the largest tank volume in that area. Internal curbs are utilized to isolate sub-areas within the buildings to minimize the spread of spillage. Containment areas are designed with sloping floors that lead to pump back sumps. In the event of spillage, fluid is collected in a sump and pumped to the appropriate tank to rejoin the process.

Designs for each process area are tailored to the material being stored or processed and the operations. Materials of construction for process tanks are selected based on the contents of these vessels in terms of reagent types present, reagent concentrations, and temperature of the contents. Concrete joints are sealed with the appropriate joint sealant for the material to be contained. Where the concrete slab intersects with concrete footings, pedestals, or any break in a continuous pour, flexible joint sealant are used. In locations where the concrete is continuously submerged (i.e., sumps) water stops are utilized.

The slope of all concrete slabs is a minimum of 1%. Entrances to buildings are constructed so that they are above containment walls. Where vehicle access is required to buildings, ramps slope up to above the level of required containment.

Piping

Primary fluid containment between tanks and process equipment throughout the mill area is provided by piping. For pipes located inside of process area, buildings or storage areas, the concrete foundations and curbed areas will provide secondary containment as described above. For pipes linking spatially separate process areas, secondary containment has been provided by lined trenches or a pipe-in-pipe.

Solution conveyance trenches for process and reagent lines have been constructed in a similar fashion as heap leach conveyance ditches. The trenches are constructed with a 12-inch low permeability soil layer overlain by 80-mil HDPE or LLDPE liner. Trenches are generally 2 feet deep and area sized to convey the contents of all piping contained within. Trenches are sloped to provide gravity flow to containment ponds suited to contain the material and/or the design storm event.

Piping material is based on the contents being conveyed. Rubber lined carbon steel pipe or HDPE is utilized for corrosive solution and for abrasive slurry (i.e., tailings). Carbon steel pipe or HDPE is used in the case where the substance is neither significantly corrosive nor abrasive.

Monitoring and Control

In addition to secondary containment, process piping and tanks are controlled through automated control systems. Tanks throughout the milling circuit are designed either to completely contain contents or to operate full and overflow into other tanks in series.

For tanks meant to contain contents, the level in the tank is controlled through an automated control system. As the level changes a signal is sent to the variable speed motor on the associated pump which increases in speed to prevent the tank from overflowing. Additionally, the tanks are equipped with HIGH and HIGH-HIGH level alarms. The HIGH alarm will be triggered at a predetermined set point and is intended to notify the operators of a potential problem requiring operator intervention. The HIGH-HIGH alarm notifies the operator that there is an overflow situation. Such tanks are equipped with engineered overflows which control the overflow from the tank and direct it to the floor within the secondary containment area.

For tanks with designed overflow, fluid will flow through each tank and finally to a final pump box. The secondary containment areas are designed to have floor surfaces sloped to drain to sumps within the containment. Containment area is sized to provide a minimum of 110% of the volume of the largest tank within the containment area. The concrete sumps and containment areas are monitored and controlled for fluid buildup. Sump pumps are installed to evacuate the containment area and pump fluids to designated destinations depending on the fluid type. Where possible, fluids from sumps are pumped back into process vessels. Rainwater or snow melt in uncovered areas is pumped in to the process through the sump pump.

Sump pump systems operate automatically based on high level switches that are alarmed at the control room. Operators may choose to place the sump pump in manual mode in order to monitor the quality of the fluid in the sump before pumping the volume to an assigned destination.

Maintenance of the sumps involves monthly physical inspections and a regular preventative maintenance schedule. In the event of a sump pump failure emergency maintenance will be undertaken to bring the pump back on line as soon as is practical. A portable sump pump will be used as a backup to a failed installed sump pump.

Emergency Power Supply has been provided for all process components for which continuous pumping and operation is desired to avoid release of solutions or product from the primary containment. Emergency power has been provided for the following:

- AAO Oxidation circuit tanks;
- Oxidized concentrate slurry Leach Tank Agitators;
- CCD Underflow Pumps;
- CCD Thickener Mechanisms;
- AAO tails Leach Tank Agitators;
- Concentrate Thickener Mechanism;
- Milk of Lime Storage Tank Agitator;
- Tailings Thickener Mechanisms;
- Tailing Thickening & Disposal area; and
- Low Grade Merrill-Crowe area.

Mill Site Containment Channel Corridor

Solution will be moved between the SHLF, TSF, Mill, and North Merrill-Crowe plant via a containment channel with side slopes of 2H:1V and lined with 80-mil HDPE geomembrane liner with a 12-inch thick secondary liner. HDPE pipe sleeves with pipe boots will be installed for all culvert placements for road crossings. In the event that the pipeline needs to be evacuated, the existing Crofoot Event pond will be utilized. The channels will be connected via a 80-mil HDPE lined open channel with pipe sleeves for culverts on road crossings.

The 2013 major modification was approved by the Division in August 2017 with the approval of the 2017 Permit renewal.

Stage 1 Heap Leach Facility Major Modification 2019

In April 2019, the Permittee submitted an application for a major modification for the construction of the Hycroft Heap Leach Facility Stage 1 located directly north of the North Process Facility and south and east of Jungo Road. The Hycroft HLF will be developed in multiple stages with a storage volume of 26.5 million tons for Stage 1 and an estimated ultimate capacity of 550 million tons. The heap will be constructed in lifts that are approximately 20 feet high up to a maximum facility height of 400 feet. Along the outer slope of each lift, ore will be placed at the angle of repose that equates to a slope of approximately 35 degrees or 1.4H:1V. To maintain the heap's overall minimum slope of 2.5H:1V, 22-foot wide benches will be constructed at the top of each lift.

The proposed operation of the HLF system includes two leach circuits, an oxidation, and a cyanide circuit. New ore that is placed on the HLF will initially undergo an oxidation step in which oxidation solution is recycled from the Oxidation Solution Vault back to the new ore to maintain the ore at a moisture content below the saturation moisture content. The duration of the oxidation period will vary based upon the characteristics of the ore. No extraction of gold occurs during this process circuit. The cyanide circuit is a traditional gold heap leach circuit where a barren cyanide solution is applied to the ore and the resulting pregnant solution outflow is routed to the Pregnant Solution Vault. The Pregnant solution is pumped to the North Merrill-Crowe for processing. The Barren solution from the North Merrill-Crowe facility is then returned to the top of each lift and applied over a designated cell area using a drip and sprinkler system.

To facilitate management of the solutions from these two circuits, the Stage 1 HLF is divided into nine cells allowing draindown from individual cells to be directed to either the Oxidization or Pregnant Solution Vaults. Solution will percolate through the heap and be collected at the base of the leach pad within the solution collection system consisting of a network of perforated pipes covered with overliner as a drainage material. The solution collection system has been designed to promote positive drainage toward the larger perforated solution collection header pipes. The solution collection headers drain into flumes which allow flows to be measured and sampled. Downstream of the flumes, the flow is transferred to either the oxidation or pregnant conveyance pipelines and routed to their respective vaults and ponds.

In an addendum to the Stage I HLF major modification dated 12 February 2020 the Permittee revised three elements of the design to accommodate the mine plan and availability of construction materials during the proposed construction period. These elements are: (1) splitting the Stage 1 design into two phases (identified as Phase A and Phase B) to reduce the risk that the entire project could not be completed prior to winter weather impacting the project and to better fit the current mine plan, (2) Geosynthetic Clay Layer (GCL) will be used as in lieu of underliner material for a portion of the pad area due to a limited supply of suitable clay materials being available in the current mine plan during the anticipated construction period, and (3) revised grading of the northern portion of the Stage I HLF pad to accommodate the use of the GCL while maintaining the required geotechnical stability of the facility.

<u>Composite Liner Description</u>

A composite liner system consisting of a low-permeability soil layer overlain with an 80-mil HDPE double-sided textured geomembrane layer has been designed to prevent vertical movement of flows through the base of the pad. The soil layer, referred to as the Underliner, will be generated primarily from a clayey sand with gravel material located in the Brimstone pit with a secondary source in the Camel pit. The Underliner will have a coefficient of permeability equal to or less than $1x10^{-6}$ cm/s.

Since the Underliner source is limited during construction of Stage 1 HLF, GCL will be utilized as the secondary containment layer in areas that do not affect the overall stability. An analysis was performed to determine that the natural ground along the northern edge of the pad should be regraded to 1 percent for the initial 200 feet below the proposed stacked ore. Additionally, a minimum width of 400 feet of Underliner is still required along the northern and western edges of the Stage 1 HLF.

The subbase preparation beneath the Underliner will consist of regrading and compacting existing ground or placement of random fill material. Underliner is to be placed in two 6-inch thick compacted lifts to form a 12-inch thick layer compacted to a minimum of 95 percent of maximum dry density as determined by the modified Proctor.

The 80-mil HDPE geomembrane will be textured to increase the frictional resistance between the underliner and overliner materials that will be in contact with the geomembrane.

Leachate Collection and Conveyance

Process solution (cyanide leach and oxidation solution) will infiltrate through the heap, collect in a drainage system at the base of the pad and gravity drain into the pregnant or oxidation solution vaults and ponds. The solution collection system will include a drainage medium consisting of crushed ore (overliner) with a network of perforated pipes.

The design of the Overliner includes a single 30-inch layer placed as a blanket on top of the HDPE geomembrane throughout the extents of the leach pad. This single layer will provide protection to the HDPE during ore placement and will have a high transmissivity to promote lateral drainage of process solutions along the base of the pad. The maximum particle size of the Overliner will be limited to 2 inches to avoid placing larger sized rock pieces against the geomembrane that may potentially cause damage. The maximum fines content (minus #200 sieve size particles) will be limited to 12 percent and a gravel content of at least 40 percent to assure the material will meet a minimum permeability of $3x10^{-2}$ cm/sec.

Solution in each cell will be collected in a network of perforated corrugated polyethylene (CPE) pipes which drain toward the main solution conveyance channel, which extends along the northern perimeter of the pad. The network of perforated CPE pipes consist of a main solution collection header pipe located in the topographic low of each cell which is fed by lateral collection pipes that range from 6-inch diameter to 12-inch diameter. The lateral collection pipes are fed by 4-inch diameter collection pipes which are spaced 35 feet apart in a herringbone pattern.

Internal solution channels have been included to assist in the transfer of solution into the main solution collection headers and provide support to the larger diameter pipes. The perforated collection pipes transfer into 18-inch dimension ratio (DR) 11 HDPE pipes before exiting the cells through a solution retention berm. At the main solution conveyance channel, the collection pipes will connect to Palmer-Bowlus flumes where solution from each cell can be monitored and measured. Valves located downstream of each flume will be used to direct the solution to either a pregnant solution conveyance pipe or oxidation solution conveyance pipe which drain to the respective process solution vault/pond. The solution collection pipes are conservatively designed to handle an application rate of 0.005 gpm/ft^2 at 50 percent capacity to account for storm events, scaling and deformation.

The solution conveyance channel is located along the northern perimeter of the pad and contains the 30-inch DR21 HDPE pregnant and oxidation conveyance pipes which collect all of the flow diverted from the cells. Both solution conveyance pipes are conservatively designed to handle an application rate of 0.005 gpm/ft^2. The pregnant solution conveyance pipe has been designed to convey the design flow at a capacity of 75 percent to allow for storm events and variability in leaching operations. The oxidation solution conveyance pipe has been designed to convey the design flow at a capacity of 50 percent to provide capacity for storm events and scaling. The solution conveyance channel was also designed to carry the expected 100-year, 24-hour storm event above the non-ore Overliner that will ballast the solution conveyance piping.

At the northwest corner of the pad the solution conveyance channel diverges from the pad perimeter and continues to the west and then south paralleling the process solution ponds. The pregnant solution conveyance pipeline exits the channel adjacent to the pregnant solution vault. A solution retention berm is placed at this intersection of the channel to promote channel drainage toward the process solution pond. After the pregnant solution conveyance pipe leaves the channel, the channel is deepened to promote storm event flow into the process solution pond. The oxidation solution conveyance pipe continues to the oxidation vault and pond.

A system for monitoring seepage within the solution conveyance channel adjacent to the pad is included in the design. Similar to the NHLF, a leak detection system is located below the Underliner layer and geomembrane within the channel. The leak detection system consists of a french drain beneath the base of the solution conveyance channel. The french drain is a 1.5-foot deep v-ditch with a 4-inch diameter perforated CPE pipe located at the invert and covered with select gravel. An 80-mil HDPE geomembrane will be placed beneath the select gravel within the trench to promote lateral flow and restrict vertical infiltration. Above the select gravel a strip of 10-oz/yd^2 non-woven geotextile is placed to provide separation between the underliner and gravel. At the end of the channel the perforated CPE pipe transitions to a solid pipe and a HDPE pipe boot is used to seal off the drain. This forces any collected solution into the dual contained solid pipe connected to the recovery sump. The sump is located on the edge of the conveyance channel before the channel exits away from the pad towards the solution ponds. The sump is outfitted with a pump which outlets back into the solution conveyance channel where it can be monitored.

Process Solution Ponds and Vaults

Pregnant and oxidation solution will gravity drain from the HLF through separate manifold pipes down to the proposed concrete pregnant and oxidation solution vaults. Pumps and piping in the pregnant vault will deliver the solution to the North Merrill-Crowe Facility for processing. After processing, barren solution will be recirculated back to the pad for leaching via existing pumps and piping in the North HLF barren vault. The oxidation solution recovered from the pad will be reconditioned in the oxidation vault then pumped back on to the heap through the oxidation recycle pipeline.

Oxidation and Pregnant Solution Vaults and Ponds

Taking into account the dead space required for the vertical pumps and the elevation of the overflow pipes from the vault to the pond, the pregnant solution vault was sized at 116,695 gallons and the oxidation solution vault was sized at 76,300 gallons. A range of flows will be managed by vertical turbine pumps mounted on top of the vaults with variable speed drives to accommodate the predicted fluctuation in flow rates. Two pumps will run in parallel to provide maximum flow pumping capacity with one additional pump installed as a spare during normal operations.

Below the reinforced concrete oxidation and pregnant vaults a double-geomembrane liner system on top of a liner bedding material will provide containment. The liner system consists of a secondary 60-mil HDPE single-sided textured geomembrane overlain with the primary 80-mil HDPE double textured geomembrane. Between the primary and secondary geomembranes a 200--mil geonet creates a leak detection system. Leakage collected between the two geomembrane layers will report to the leak detection sumps that have a capacity of 655 gallons. The backfill between the primary geomembrane and the concrete vaults contains a reclaim riser pipe in the event solution is detected above the primary liner.

The overflow pipes installed into the vaults will discharge into the ponds in the event that the pumps are not operating or solution entering the vault exceeds pumping capacity. The overflow pipes are sized to handle the full capacity of the conveyance piping system (13,000 gpm).

The oxidation and pregnant solution ponds were designed with a double-geomembrane liner system on top of a liner bedding material. The liner system consists of a secondary 60-mil HDPE single-sided textured geomembrane overlain with the primary 80-mil HDPE double textured geomembrane. Between the primary and secondary geomembranes a 200-mil geonet will be installed to create a LCRS. The LCRS in each pond drains to a recovery sump which has a 7,480-gallon capacity. Fluid captured by the LCRS Sump will be pumped back into the ponds.

The LCRS sumps will be collocated with the pond pumpback system. The combined sump will be 6 feet below the bottom of the pond where the bottom 3 feet will serve as the LCRS sump and the top 3 feet the pumpback sump. The sump top and bottom dimensions are 50 feet by 50 feet and 20 feet by 20 feet, respectively.

The process solution pond will contain solution or storm water not captured by the solution conveyance piping or solution which overflows from the pregnant or oxidation ponds. The solution will enter the pond via the solution conveyance channel or the pond overflow spillways. The process solution pond has been sized to provide sufficient storage in the event either of the ponds required maintenance or repairs.

Similar to the pregnant and oxidation ponds, the process solution pond was designed with a double-geomembrane liner system on top of a liner bedding material. The liner system consists of a secondary 60-mil HDPE single-sided textured geomembrane overlain with the primary 80-mil HDPE double textured geomembrane. Between the primary and secondary geomembranes a 200-mil geonet will be installed to create an LCRS that drains to a recovery sump which has a 7,480 gallon capacity. Fluid captured by the LCRS Sump will be pumped back into the ponds. The LCRS sumps will be collocated with the pond pumpback system. The combined sump will be 6 feet below the bottom of the pond where the bottom 3 feet will serve as the LCRS sump and the top 3 feet the pumpback sump.

The sump top and bottom dimensions are 50 feet by 50 feet and 20 feet by 20 feet, respectively. The ponds are designed to provide a combined volume that can store the normal operating volume within the pond system in addition to heap drainage associated with average precipitation and normal operations, runoff from a 100-year, 24-hour storm event, and heap draindown in the event of plant/pump outage (12 hours).

Process Solution Pipeline Drain Pond

The routing of the barren and pregnant solution piping from the existing North Merrill-Crowe Facility to the Hycroft HLF will parallel the haul road for the majority of the alignment. Around the North Merrill-Crowe Facility, the solution will be conveyed through dual containment pipe due to the limited area around the existing infrastructure available for a geomembrane lined channel. Along the alignment, at the location where the pipeline containment transitions from pipe-in-pipe to a geomembrane channel, a low point in the profile also exists. A geomembrane lined drain pond has been positioned at this location to capture storm water runoff from the geomembrane channel and leakage that may be captured by either pipe containment system. The pond will only be operated when a leak in one of the pipes occurs, the solution piping needs to be drained for maintenance, or storm water enters the pond from the channel or small upgradient tributary area. The pond is lined with an 80-mil HDPE double textured geomembrane installed over a Liner Bedding material. The pond will be drained within 20 days whenever solution enters the system by the means of an evacuation or pump truck. The required pond volume has been determined to be 147,090 gallons below freeboard.

Seismic Stability

The stability evaluation was completed to confirm the HLF will remain stable throughout the life of the structure. The stability analysis results indicate that the facility will be stable under static conditions. Suitable factors of safety were achieved under static and pseudostatic (OBE) loading conditions for Section A. For Section B, only the static conditions achieved suitable factors of safety. The majority of the pseudostatic loading scenarios yielded a factor of safety less than the minimum required value of 1.05. A seismic slope deformation analysis was performed for the cross sections that yielded a factor of safety less than 1.05 under pseudostatic loading conditions. The analyses indicate a median value of displacement of less than 12 inches. Any displacement experienced during an event is expected to occur incrementally along a distance of approximately 500 feet. Such displacement would occur primarily within the ore and is not expected to compromise the overall stability and integrity of the base liner, nor result in ore moving outside of containment.

Stormwater Controls

The intent of the stormwater management plan is to prevent damage to the mine infrastructure and downstream receiving points while maintaining the quality of both groundwater and runoff water. The design basis of the stormwater plan is to:

- Divert non-contact water around the mine facilities and discharge to downstream water courses;
- Convey sediment laden runoff, as necessary, to detention basins before being discharged to downstream water courses; and
- Contain precipitation that has come in contact with process solution.

Surface water runoff from watershed areas upstream of the HLF will be intercepted and routed around the proposed facility through diversion channels to natural drainages. Runoff from the impacted areas or that has come into contact with process solution will be stored internally within the HLF and ponds.

Hydrologic and hydraulic calculations were performed to establish design peak flows, runoff volumes, channel capacities, minimum channel dimensions, and slopes required to pass the design peak flows from up gradient watersheds that will be diverted around the HLF. All stormwater diversion channels were designed to withstand the discharge of the peak flow from a 100-year, 24-hour storm event. Riprap protection will be used, where necessary, to minimize erosion due to runoff resulting from a maximum design storm event.

The Hycroft HLF Stage 1 major modification was approved by the Division in Month 2020.

Petroleum Contaminated Soil Management

A Petroleum Contaminated Soil (PCS) Management Plan was approved by the Division as an EDC in August 2011, authorizing on-site disposal of PCS at a specified location on the Brimstone Expansion WRD, W-37. Prior to management under the PCS Plan, determinations must be performed to demonstrate that the PCS is not hazardous waste. Hazardous waste must be managed and disposed of in accordance with applicable regulations. On-site disposal of PCS is also contingent on the results of periodic screening analyses, which must show that the PCS does not exceed screening levels established via risk assessment for various organic constituents. Otherwise, the PCS must be properly disposed of off-site.
PCS may be temporarily stored on three Division approved PCS temporary holding pads while screening analyses are performed, or it may be provisionally placed at the Division approved disposal location on the Brimstone Expansion WRD,

provided that it will be removed and properly disposed of elsewhere in accordance with approved contingency plans if it exceeds screening levels during subsequent screening analyses. Various time limits and other stipulations in the PCS plan and Permit apply to temporary storage, provisional placement, and contingency plans. Schedule of Compliance (SOC) Item I.B.5 was added to the Permit with the PCS plan approval, requiring documentation, by 30 November 2011, of removal and proper disposal of all PCS from the former bioremediation pads. This task was completed on 22 November 2011 and the full report of the removal and disposal was received on 28 November 2011. The SOC Item also required completion of final permanent closure of the former bioremediation pads, including proper reporting, clean-up, and disposal of any PCS found under the bioremediation pad liners, by 29 December 2011. This was completed upon receipt of the final report on 30 December 2011. This SOC Item was removed from the Permit with the 2017 renewal.

The three PCS temporary holding pads are to be constructed approximately 1,000 feet east of the north end of the Crofoot Heap Leach Pad. From the bottom up, the liner system of each temporary holding pad consists of a compacted subgrade, a layer of geotextile, a single 80-mil HDPE liner, a layer of geotextile, and an 18-inch gravel drainage and protection layer. A minimum 2-foot freeboard must be maintained above any fluid in the temporary holding pads.

C. <u>Receiving Water Characteristics</u>

An extensive program to characterize the hydrogeological conditions present in the vicinity of the Brimstone processing facilities was performed. Boreholes were drilled to depths between 300 and 880 feet. Groundwater was not encountered in any of the boreholes except for a trace (2 gpm) amount of groundwater encountered at a depth of 355 feet near the northern boundary of the project area. Further drilling indicated the zone was neither laterally nor vertically continuous. Analysis of a sample of the groundwater indicated occasional exceedances of the Profile I reference values for iron, lead and manganese.

In the area of the SHLF, groundwater was encountered at depths of less than 200 feet, and in the flat areas west of the SHLF, Crofoot Heap Leach Pad, and North Waste Rock Facilities, groundwater was encountered at depths ranging from 136 feet to as low as 10.5 feet. In order to verify groundwater quality in these areas, a combination of existing wells and new wells are monitored as follows:

- Downgradient of the North Waste Rock Facility: H10HR-003 (existing) and WR-MW4 (new);Downgradient of the NHLF: H10HR-001 (existing);
- Downgradient of the South Waste Rock Facility: H10HR-018 (existing);

- Downgradient of the West Waste Rock Facility: WR-MW1, WR-MW2, WR-MW3 (all new);
- Upgradient of the SHLF: H10HR-023, H11HR-005 (both existing); and
- Downgradient of the SHLF: SH-MW1, SH-MW2 (both new).

Each of the above wells will be installed and monitored for water elevation and samples analyzed for Profile I constituent concentrations prior to construction of the facilities, and monitored quarterly thereafter.

The only perennial near-surface water occurrence that exists within the area is approximately 2 miles to the west of the Brimstone project, consisting of shallow 'duck ponds'. Make-up water is supplied from the existing Crofoot Mine wells, which are located approximately 2 miles southwest of the historic town of Sulphur along the railroad right-of-way. Four of these wells were sampled to determine water quality. In general, groundwater quality meets NDEP Profile I reference values except for occasional exceedances of arsenic (up to 0.05 mg/L), chloride (up to 1,460 mg/L), TDS (up to 2,820 mg/L), and antimony (up to 0.033 mg/L), all from natural sources.

D. Procedures for Public Comment

The Notice of the Division's intent to issue a Permit authorizing the facility to construct, operate and close, subject to the conditions within the Permit, is being published on the Division website: https://ndep.nv.gov/posts/category/land. The Notice is being mailed to interested persons on the Bureau of Mining Regulation and Reclamation mailing list. Anyone wishing to comment on the proposed Permit can do so in writing within a period of 30 days following the date the public notice is posted to the Division website. The comment period can be extended at the discretion of the Administrator. All written comments received during the comment period will be retained and considered in the final determination.

A public hearing on the proposed determination can be requested by the applicant, any affected State, any affected intrastate agency, or any interested agency, person or group of persons. The request must be filed within the comment period and must indicate the interest of the person filing the request and the reasons why a hearing is warranted.

Any public hearing determined by the Administrator to be held must be conducted in the geographical area of the proposed discharge or any other area the Administrator determines to be appropriate. All public hearings must be conducted in accordance with NAC 445A.403 through NAC 445A.406.

E. Proposed Determination

The Division has made the tentative determination to issue the modified Permit.

F. Proposed Limitations, Schedule of Compliance, Monitoring, Special Conditions

See Part I of the Permit.

G. Rationale for Permit Requirements

The facility is located in an area where annual evaporation is greater than annual precipitation. Therefore, it must operate under a standard of performance which authorizes no discharge(s) except for those accumulations resulting from a storm event beyond that required by design for containment.

The primary method for identification of escaping process solution will be placed on required routine monitoring of leak detection systems as well as routinely sampling downgradient monitoring well(s) and surface water. Specific monitoring requirements can be found in the Water Pollution Control Permit.

H. Federal Migratory Bird Treaty Act

Under the Federal Migratory Bird Treaty Act, 16 U.S. Code. 701-718, it is unlawful to kill migratory birds without license or permit, and no permits are issued to take migratory birds using toxic ponds. The Federal list of migratory birds (50 Code of Federal Regulations 10, 15 April 1985) includes nearly every bird species found in the State of Nevada. The U.S. Fish and Wildlife Service (the Service) is authorized to enforce the prevention of migratory bird mortalities at ponds and tailings impoundments. Compliance with State permits may not be adequate to ensure protection of migratory birds for compliance with provisions of Federal statutes to protect wildlife.

Open waters attract migratory waterfowl and other avian species. High mortality rates of birds have resulted from contact with toxic ponds at operations utilizing toxic substances. The Service is aware of two approaches that are available to prevent migratory bird mortality: 1) physical isolation of toxic water bodies through barriers (e.g., by covering with netting), and 2) chemical detoxification. These approaches may be facilitated by minimizing the extent of the toxic water. Methods which attempt to make uncovered ponds unattractive to wildlife are not always effective. Contact the U.S. Fish and Wildlife Service at 1340 Financial Boulevard, Suite 234, Reno, Nevada 89502-7147, (775) 861-6300, for additional information.

Prepared by: Shawn Gooch, P.E.

Date: 21 May 2020

Revision 00: Renewal with major modification, major modification (Mill and Combined South HLF/TSF) Boiler Plate Updates – [SG -07/2017]

Revision 01: Major modification of Stage 1 HLP and Boiler Plate Updates [SG 05/2020]